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CANADA AS A FIELD FOR MINING INVESTMENT.

CANADA has never yet become widely recognized as a country possessed of a great future in respect of its mineral wealth. In the official reports of exports from the Dominion, the produce of agriculture, fisheries, forests, animals and their produce, and even manufactured articles, have all largely exceeded in value the total export of minerals. The value of minerals produced in Canada has, nevertheless, for some time, been steadily increasing each year, and in 1895 amounted to over \$22,500,000. But this increase, satisfactory enough in itself, does not fully evidence the development which is now about to occur as the outcome of new and exceptional conditions. It is more particularly in the western province of the Dominion, British Columbia, that epoch-making progress of this kind has begun; but its effect will not be confined to that province, for what is gained there must indirectly assist in bringing the necessary skill and capital to bear upon many minerals of the older provinces, the development of which has heretofore either languished or has been pursued with intermittent success, alternating with periods of stagnation. Such disappointments have too often been due to the practical worthlessness or insignificance of the deposits or undeveloped "prospects" foisted upon the public under the name of "mines," but in other cases really valuable properties have been over-capitalized or swamped by extravagant and incompetent management. In still other instances attempts have been made to work minerals which, although of value, do not yet admit of profitable exploitation under the local economic conditions, but which have absorbed considerable amounts of capital without at any time having afforded the least hope of becoming paying investments. Similar circumstances have, no doubt, attended the history of every mining region; but Canada has perhaps suffered exceptionally in this way in the past.

Returning after this digression to British Columbia, it may be interesting to trace in a few words the short history of mining in that province, which promises very soon to produce each year more from its mines than the aggregate yield of all the remaining provinces of Canada. — "Placer," or alluvial gold, was discovered on the

Thompson in 1857, and although coal had been found to exist on Vancouver Island many years previously, the country—then an isolated and remote colony—had remained practically a fur preserve of the Hudson's Bay Company, where the most important news, slowly conveyed by the annual "brigades," was the price of beaver skins in London. All this was at once changed by an influx of gold miners, pressing on from point to point against great difficulties, of which many a thrilling tale remains to be told. In 1863, the "golden year" of Cariboo, nearly \$4,000,000 in gold is estimated to have been produced, a result which, in proportion to the areas worked and the population actually engaged, was phenomenal. From this time the output decreased year by year as the comparatively limited known tracts became exhausted which were adopted for the somewhat rude methods of work possible in places very remote from efficient means of communication.

Meanwhile, the mining of the precious metals was proceeding by leaps and bounds in the Western States of the American Union, similar geographically and geologically, in position and character, to British Columbia, until there appeared to be some real basis for the assertion, often jestingly made, that Providence has stored all the metalliferous wealth of the continent to the south of the international boundary. To those familiar with the circumstances, there were other reasons for this slackness of development in the north, which need not here be detailed, but chief among them was the absence of the requisite facilities of transport, and thus, concurrently with the completion of the western part of the Canadian Pacific Railway, a new era began, and in a very short time the local conditions have been largely reversed. In West and East Kootenay, everywhere within reasonable distance of railway lines, mining camps began to spring up upon groups of rich deposits carrying silver and gold. The depreciation of silver, which became serious about the same time, has undoubtedly retarded the opening up of some of these deposits, but where they are rich enough to be very profitably worked with silver at fifty cents to the ounce, as is the case with a large proportion of the Kootenay ores, this is rather a sentimental than a real drawback, and one which has already been largely overcome. Other deposits, producing gold, with copper as a bye-product, have been affected only sympathetically.

The principal mining sub-districts so far established in West Kootenay are, nearly in order of their discovery, Nelson, Ainsworth, Slocan, and Trail. Nelson includes the Hall mines, yielding copper and silver, beside silver-lead ores, and some containing gold. Ainsworth and Slocan are characterized by silver-lead ores, with some yielding gold and other metals, particularly in the last-named sub-district. Trail, although later in claiming its place, has already

surpassed the older "camps" in the matter of development and interest on the part of the mining world. Its deposits of auriferous pyrrhotites are probably unique; the veins as far as developed are of extraordinary dimensions and frequency, and several mines have even now reached the stage of paying handsome monthly dividends. The town of Rossland, in Trail district, is estimated to have a population exceeding 3,000, though but a few months old.

For these several mining centres, although so young, railways have already been built, mining machinery of all kinds has been introduced, several large smelters, both for reducing silver-lead ores and for matting have been established, and from them the output is daily increasing. Perhaps a better idea of the amount of activity in prospecting and mining (although the latter is not more than in its initial stages) may be given by quoting a few figures. Thus, in 1895, over 3,000 new mineral claims were registered in West Kootenay alone. About fifty properties in all have become "shipping mines" on a greater or smaller scale, from which the aggregate output in 1895 is valued at about \$2,100,000, comprising silver to the value of \$739,000 and gold \$679,500, followed by lead and copper representing smaller amounts. For the first six months of the present year the value of the output is estimated at over \$2,200,000.

Time does not serve to allude individually to the several "camps" of West Kootenay, nor to more than accord mention to the large district of East Kootenay, which has been to some extent outstripped for the moment, although everywhere the most hopeful spirit prevails, and in a large number of cases important deposits are being opened up, wherever that confidence leading to the investment of money can be gained. Other notable districts in the southern part of British Columbia are Boundary Creek, from which remarkable ores containing tellurium with gold and silver come, and in which immense deposits of copper ores are found, Okanagan, noted chiefly for free-milling gold quartz, Similkameen in which placer gold and platinum are being worked, and Cayoosh Creek with rich gold-bearing quartz-veins.

On the coast, from Alberni and other points, most satisfactory reports begin to come, although but little in the way of actual returns has yet been achieved. To the north, and as yet some 200 miles distant from any railway, Cariboo, which in early years proved to be so rich a find for the placer miner, has come to the front again as the site of extensive hydraulic mining operations, dealing on the large scale with comparatively low-grade auriferous gravels by methods already perfected by practice in California. The rapid and full-fed rivers of the district prevent the occurrence here of any questions of dammage to cultivated lands from such mining opera-

tions, while streams and lake-reservoirs in the mountains provide ample supplies of water at every desired level. Many years ago, the writer maintained, with special reference to this district, that a development of the kind now taking place was certain to occur, relying upon the fact that in every such region the highly concentrated old stream-gravels, which were alone susceptible of profitable exploitation by comparatively primitive methods, must be associated with much more widely spread but less rich deposits; a forecast which is fully realized by the work now in progress.

Another interesting feature that may be mentioned in passing, is the amount of money now being carefully spent in placing extensive dredging plants of various types along a great part of the length of the Fraser River, which may be regarded as the great natural "ground-sluice" of the country, but of which the bed and deeper bars could never be reached or worked by the early miners. The quartz-veins of the Cariboo district as yet await development.

In writing of the prospective value of British Columbia as a mining country some years ago, and when but little progress had been made towards its realization, it was pointed out that this province (some 390,000 square-miles in area) with the Yukon district of the North-West Territory of Canada, together contain over 1,200 miles in length of the most important metalliferous region of the continent, that of the Cordillera or Rocky Mountain belt; a length equivalent to that included in the whole United States, from the 49th parallel to Mexico. The actual initial development of a permanent kind in this vast tract has, so far, been principally confined to a few districts of comparatively limited size, but there is every reason to believe, from the known geological conditions, and from analogy with the corresponding region to the south, that as skilled prospecting is extended from point to point, a mining country fully comparable with that of the entire western tier of States of the American Union will be found to exist. This development will take time, and must be supported by the opening up of paying properties, such as to attract the necessary financial backing. The prospector, generally poor, if enthusiastic and enterprising, first enters the field; following him come those provided with a limited amount of capital, acquiring, at comparatively small cost, the claims which he may have staked out. To such speculative investors many failures with some large prizes must occur, but the disposition to enter into ventures of the kind is characteristic of the local capitalist of the West, who has already largely interested himself in British Columbia. At a certain interval, when the "prospect" has been converted into a running mine, with a developed body of ore in sight and capable of yielding certain dividends for some time, the larger capitalist, requiring no more than a fair return

for his money without undue risk, enters the field, ready to pay a good price for what he requires. All stages of this progress may already be found in British Columbia alone, where there is ample room, and where opportunities of every kind will continue to occur for many years to come. It is devoutly to be hoped that the process of expansion, although certain to be rapid, will continue to be sound, and that the conditions of a "boom" may be avoided by the exercise of proper caution on the part of investors. It may be taken for granted that many undeveloped properties or worthless claims will be offered to the public as "investments." The purchaser cannot himself be familiar with the facts in most cases, but he should, at least, require the report of some reputable authority, made wholly in his interest.

Little need be said of the coal mines of British Columbia in the present connection, for these, in the region of the coast and where already open to commerce, have long passed the stage at which any difficulty was found in establishing confidence for their operation. They are in the hands of strong corporations, and their output is limited only by the dimensions of the profitable market, in which they compete, along the west coast, with the coals of Great Britain, New South Wales, and the State of Washington. The production now averages about a million tons annually. New fields, however, remain to be opened up when called for, even on the coast, particularly in the Queen Charlotte Islands. In the interior region, in the Crow's Nest Pass and the Nicola Valley, as well as in other districts still further from means of communication, important deposits of coal are known to exist. That of the Crow's Nest Pass has been shown by the Geological Survey to be an exceptionally valuable one, and about one hundred miles of railway only are required to connect it with the metalliferous mines of West Kootenay, where at present some considerable part of the fuel employed in smelting is Welsh coke, costing about fifteen dollars a ton. The coal mines on the line of the Canadian Pacific Railway, near Canmore, although politically included in the district of Alberta, also geographically belong to the Rocky Mountain region. They yield anthracite and steam-coal, of which the output is here again restricted only by the demand.

In writing thus first and at some length of British Columbia, I have placed in the front that region of Canada which affords now the greatest opportunities, and of which the product in metallic minerals may very probably for some time to come increase two-fold each year; but in doing so the resources of that part of the Dominion to the east of the Rocky Mountains must not be overlooked. The North-West Territory and Manitoba—speaking only of the southern moiety of that great interior region which has

already been rendered easy of access by railways and roads—is pre-eminently a land for agriculture and stock-raising, but a great area is now known to be underlain by beds of coal, or of lignite-coal, often excellent fuels and everywhere available for local use. In a report on the southern part of what is now the District of Alberta, published more than ten years ago, the amount of coal contained in one of these beds in a known outcrop of sixty-six miles in length, and at an easily workable depth, was estimated at 330,000,000 tons. The mines at Lethbridge are situated upon one part of this particular deposit. The vast extent of these coal-fields of the North-West may be further evidenced by the fact that a rough estimate of their area between the 49th and 56th parallels amounts to 50,000 square-miles, than which there is probably no larger tract in the world known to be characterized by a practically continuous spread of valuable mineral fuels.

Natural gas, in important quantity, has also been found in several borings sunk for other purposes, and although not as yet utilized, the geological conditions indicate that a practically inexhaustible reservoir of this convenient fuel extends beneath a great area of country. Remarkable outcrops of "tar-sands," or sand impregnated with bituminous matter, found along the Athabasca River, support the belief that one of the most notable petroleum-bearing territories of the world there awaits development. Impressed by its probable importance, the Government has begun experimental boring operations, under the control of the Geological Survey, of which the results are awaited with great interest; and although it may not be assumed that the first or even the second boring must necessarily be successful, the eventual discovery of petroleum can scarcely be considered doubtful.

So much space has been given in foregoing paragraphs to the western half of Canada, that but slight mention can now be accorded to the mineral resources of the older eastern provinces. These are already better known and more fully utilized wherever the actual conditions permit this to be done profitably; but there remain numerous instances in which the products command a world-wide market, and in which rapid expansion may legitimately be anticipated.

The rocks of the Huronian system of geologists, have long been recognized as of particular interest economically, because of the associations with them of various metallic minerals, among which copper, nickel, iron, and gold have so far proved to be the most important. The nickeliferous pyrrhotites and copper ores of Sudbury are already favourably known to metallurgists, and the mines actually in operation are fully supplying the growing demand for nickel. At the moment, the most promising field for investment in

western Ontario, undoubtedly occurs in connection with gold-mining. The existence of gold-bearing quartz-veins in the Huronian rocks has been known for many years, but of late, a few well equipped though small mining and milling plants have been established, chiefly on the picturesque shores of the Lake of the Woods, and discovery is being very actively pushed throughout a wide belt of country running thence nearly to the border of Lake Superior, and including Rainy Lake, Seine River, Manitou Lakes, and a plexus of other smaller rivers and lakes. There can be no reasonable doubt of the value of a considerable proportion of the properties taken up, and under skilled advice, with the necessary capital for bonding and opening out groups of claims in an experimental way with a view to the purchase of those proving to be satisfactory, the conditions here appear to be now most favourable to judicious investment.

On this region Professor A. P. Coleman, of the Ontario Bureau of Mines, makes the following remarks, which appear to me to be sound and judicious: "Gold presents the brightest outlook of all for speedy expansion, especially in the part of the province west of Lake Superior; and I fully expect to see a well-established gold-mining industry there within a few years, something of a quiet and permanent character, like that of Nova Scotia, but on a larger scale, since the extent of our gold-field is much greater."

While speaking of this western part of Ontario, a word may be added respecting the exceptionally rich silver deposits of the vicinity of Thunder Bay, from which, although comprised within a limited area, several million dollars worth of silver have already been drawn. These at the present time are idle, but they appear to wait only a more systematic method of working of a collective character to renew their importance.

Chief among the mineral industries of the southern or peninsular part of Ontario, are the production of petroleum, salt, natural gas, gypsum, and materials of construction of all kinds. These, however, have become established domestic industries, in respect to which the need of additional capital is not much felt.

Iron ores of excellent quality abound in many parts of Ontario and Quebec, and a limited amount of iron is already produced in both provinces, but the absence of adjacent coal deposits, with the duty maintained against ores by the United States, render the mining and smelting of iron subject entirely to tariff provisions.

The mining of apatite or "phosphate," at one time considerable, and from which much was hoped, particularly in certain districts of Quebec, has of late years become unprofitable because of the competition of cheaper, though lower grade, foreign minerals applicable to the manufacture of fertilizers. In these very districts, however, the production of mica for electrical purposes has

since largely taken the place of the older industry, while the mining of graphite and its treatment by improved processes, has been renewed with every prospect of success, both in these parts of Quebec and in Ontario.

In respect to asbestos (chrysotile) of the first quality, Quebec stands almost alone as a producer, and from a limited tract supplies the greater part of this material used in the arts, the business being in the hands of a few well-organized companies. Chromic iron, from the same district, is now attracting some attention. Copper-pyrites is raised in considerable quantities about Capetown and shipped to works in the United States, where it is also used as a sulphur-ore. Gold-mining, in the Chaudière country, has never yet become an established industry of a large kind, but renewed efforts are now being made in this direction, with the aid of modern knowledge and appliances suited to the working of such alluvial deposits as occur there. Slate of excellent quality is produced in quantity sufficient for local demands in a neighbouring part of the province, where numerous handsome varieties of marble also exist, although as yet scarcely worked.

Turning to the maritime provinces, of which Nova Scotia is the richest in minerals, coal is found to be of predominant importance, with an output of about two and a half million tons each year. The coal mines of Nova Scotia have been in operation since 1827, and much of their product now finds its way up the St. Lawrence to Montreal, where it is used for manufacturing purposes, while shipments are also made to the New England States and to Newfoundland, and iron smelting and the manufacture of steel from local ores employ increasing quantities on the spot.

From 1861 the mining of gold-bearing quartz-veins has been prosecuted in Nova Scotia, and in the main with success, the annual product being now about 20,000 ounces, maintained with considerable regularity. The nature of these veins has been carefully studied by officers of the Geological Survey, and has become well understood. They are found to follow the lines of anticlinal folds, in precisely the same manner with the well known reefs of Bendigo, in Australia, but the flexures are broader and further apart in Nova Scotia, and the veins themselves appear to be more permanent in depth. The knowledge now gained of these veins renders it practicable and desirable that they should be worked in a larger way, combining series of parallel and adjacent deposits under a single management, and opening them up by means of one or two principal shafts. Much would be gained by this in economy and in the perfection of milling and concentrating machinery; and under careful management there is little doubt that the gold product of the province might be easily doubled within a few years.

Among other valuable minerals occurring in the maritime provinces are copper, manganese, antimony, oil-shales, and infusorial earth or "tripolite," but none of these have actually been produced as yet in very important quantity. Gypsum is abundant, and is somewhat extensively worked and exported, while of structural materials, the fine red syenite quarried and polished in New Brunswick may be specially mentioned.

Respecting most of the great northern extent of Canada, including not only the continental lands, but also the archipelago of the Arctic Ocean, comparatively little is as yet known, but in considering this region, with such slender information as we have of its geology, it may be taken for granted that beyond the limits of any profitable agriculture, important communities dependent on mining will eventually be formed, and that mining will yet become a main resource of these inhospitable lands. The enormous deposits of iron ores lately discovered in Northern Labrador by Mr. A. P. Low, constitute a reserve of this kind which may one day be drawn upon, and even in the more remote Arctic islands, placed upon the map by our intrepid explorers and whalers, minerals of value, including coals, have been found, which may not prove to lie entirely beyond the reach of modern civilization.

Of half a continent, embracing as Canada does in different parts of its extent the most varied geological conditions, it is not possible in a short article like this to even enumerate the minerals already discovered and the known districts of promise. It has been endeavoured to notice chiefly those fields which at the time present the most inviting prospects for the intelligent utilization of capital. Those parts of the Dominion, chiefly in the south, which can no longer be described as unexplored in a geographical sense, are now only beginning to reveal under patient and minute search many of their valuable ores. Of the country as a whole, it is safe to predict that the mineral wealth to be ultimately developed will not fall short of that of the United States, than which the extent of Canada is only slightly greater. This areal aspect of the question is chiefly useful, under due reservations, in enabling such a comparison to be established, for to the south of the international boundary the circumstances have already led to a vast development of the mining industry. This has resulted largely from the fact that to the virgin deposits laid bare by long processes of nature, it has been found possible to apply at once the most improved machinery and methods, coupled with great energy, as well as the support and confidence of capital, coming chiefly from abroad and lending itself on easy terms to the building of railways and the opening of mines. This, of course, applies chiefly to the western third of the Union, where the development of mining has been almost everywhere concurrent

with the introduction of railway communication, and of which the products have to a large extent depended for their value upon the prices ruling in the open markets of the world. The great expansion of the coal and iron industries of the eastern and southern states, having been initiated and fostered largely by tariff provisions, occupies a different plane. In Canada, a very similar course of progress is now beginning, particularly in the west, and every indication points to the conclusion that an opportunity, not often found in the course of industrial development, now offers itself to the profitable utilization of idle capital, within the limits of the Empire, under the safeguard of British laws, and in a country where the monetization of silver or other form of repudiation of debt has never found so much as a responsible advocate.

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